



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

TESTS IN EFFICIENCY IN ARITHMETIC
A COMPARISON OF THE RESULTS OBTAINED IN THE RURAL
SCHOOLS OF SANTA CLARA COUNTY AND RESULTS OB-
TAINED IN A COUNTY IN SOUTHEASTERN OHIO¹

ERNEST R. WOOD, A.B.

Scholar in Department of Education and Psychology, Clark University

In the June number of the *Elementary School Journal* is a very interesting study entitled, "Tests of Efficiency in the Rural and Village Schools of Santa Clara County, California." Especially interesting is this article to those who are dealing by like methods with the problem of supervising rural schools in other parts of the country. In view of the fact that Mr. Zeidler in his introduction lamented that it was not possible for him to make a comparison of the results which he obtained with the results obtained in other rural sections of the country, the following distribution tables, comparative tables, and charts have been prepared.

Since Mr. Zeidler has explained so carefully the nature of the tests and the methods employed in giving them, it is not necessary to enter into a discussion of the same at this point. However, it may be best to state that the tests were given under as normal conditions as could be attained. The greater majority of the children were tested between December 1, 1915, and February 1, 1916.

RESULTS OF THE TEST

Table I shows the distribution of children as to the number of examples attempted. It also shows the distribution of scores by grades for the four subjects, addition, subtraction, multiplication, and division, and the median score obtained in each case. One of the striking points of similarity between the table given by Mr. Zeidler and Table I is the wide range of distribution.

¹ These tables were taken from a study that was made last year under the direction of Dr. W. L. Gard, department of history and science of education, Ohio University.

TABLE I

ADDITION (TIME, 8 MINUTES)

[illegible]

SUBTRACTION (TIME, 4 MINUTES)

[illegible]

MULTIPLICATION (TIME, 6 MINUTES)

[illegible]

DIVISION (TIME, 8 MINUTES)

Grade	Total Papers	Number of Examples Attempted																								Median Score	
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
VIII.....	115	2	1	2	1	13	14	8	13	18	7	9	4	6	3	5	2	5									8.2
VII.....	181	...	7	19	21	44	17	16	9	2	9	3	2			1				1					1		5.4
VI.....	187	4	6	10	15	21	17	16	16	2	2	2								4							4.4
V.....	162	14	24	36	32	31	33	11	3	2	0	3			1					10							3.2
IV.....	169	78	42	18	16	9		2		1										18							1.2

In Table II the examples worked correctly have been distributed in the same manner as in the previous table. In comparing

TABLE III

MEDIAN SCORE OF ATTEMPTS					MEDIAN SCORE OF ACCURACY			
Addition					Addition			
V	VI	VII	VIII		V	VI	VII	VIII
6.6	7.4	8.1	10.2	..... Indiana.....	3.6	4.4	4.9	5.8
6.7	8.4	9.2	10.2	..... Detroit.....	3.9	4.6	5.4	6.7
7.2	8.3	9.2	11.0	..... Boston.....	3.7	4.9	5.6	7.8
6.0	8.1	8.7	9.8	..... 24 cities of Kansas.....	3.1	5.3	5.8	7.0
5.5	6.1	7.5	8.8	..... Santa Clara County.....	1.8	2.3	3.5	4.3
6.0	6.5	6.7	7.5	Rural schools of a county in south- eastern Ohio.....	2.4	3.2	3.0	3.9
Subtraction					Subtraction			
7.3	8.9	10.2	11.2	..... Indiana.....	5.0	6.5	7.8	8.9
8.0	8.8	9.8	12.3	..... Detroit.....	5.5	6.2	7.3	9.5
7.6	9.0	10.0	11.4	..... Boston.....	4.9	6.3	6.9	8.6
6.7	9.1	10.0	11.5	..... 24 cities of Kansas.....	4.2	7.4	8.3	9.9
5.5	6.4	7.5	9.8	..... Santa Clara County.....	2.8	3.5	5.2	6.8
5.7	7.3	8.3	10.1	Rural schools of a county in south- eastern Ohio.....	2.0	3.6	5.4	7.3
Multiplication					Multiplication			
6.3	7.6	8.6	10.2	..... Indiana.....	3.9	5.1	5.9	7.3
6.4	7.4	9.6	10.5	..... Detroit.....	3.8	4.8	6.0	7.5
5.8	6.9	8.0	9.5	..... Boston.....	3.3	4.8	5.1	6.5
5.8	8.1	9.0	10.9	..... 24 cities of Kansas.....	3.3	6.2	7.0	8.9
3.9	4.8	6.1	7.5	..... Santa Clara County.....	1.25	2.5	3.4	4.9
4.6	6.2	7.2	7.2	Rural schools of a county in south- eastern Ohio.....	1.6	3.2	4.5	5.8
Division					Division			
4.5	5.7	8.5	10.6	..... Indiana.....	2.6	4.8	6.7	9.1
4.9	6.4	8.6	10.3	..... Detroit.....	2.7	4.4	7.1	8.8
4.5	5.8	6.9	8.8	..... Boston.....	2.0	3.3	5.1	6.9
4.0	6.5	9.3	10.1	..... 24 cities of Kansas.....	2.1	5.4	8.1	9.3
3.3	3.8	5.9	7.1	..... Santa Clara County.....	0.5	1.6	3.2	4.5
3.2	4.4	5.4	8.2	Rural schools of a county in south- eastern Ohio.....	1.0	2.0	3.3	6.4

the median scores of similar grades in the four fundamentals we again note that the same condition exists as we found above, viz., that the median scores in subtraction are higher than the median

scores in any other of the operations with the exception of Addition V. By Courtis' standard this is as it ought to be.

In Table III the median results that have been obtained in Indiana, Detroit, Boston, and 24 cities of Kansas can be compared with the results obtained in Santa Clara County and those obtained in a county in southeastern Ohio. The medians from the cities mentioned above were obtained from well-organized systems, while, on the other hand, supervision in the rural schools of southeastern Ohio has been in force for only three years. We see at a glance that the results of the cities and the rural districts fall into two distinct groups. This is true not only in the case of speed but in the case of accuracy as well. In fact, there is a far greater difference in the accuracy comparison of the two groups than in the speed comparison. Comparing the two rural groups more closely, we find that the results average very well, for at no point is there a very striking difference, unless it is in the accuracy in Division, Grade VIII.

TABLE IV

SUBJECT	GRADE	RURAL SCHOOLS IN A COUNTY IN S.E. OHIO		PERCENTAGE OF EXAMPLES CORRECTLY WORKED		
		Attempts	Rights	Rural Schools in S.E. Ohio	Santa Clara County	24 Cities in Kansas
Addition.....	VIII	7.5	3.9	52	48.9	71
	VII	6.7	3.0	44.7	46.7	67
	VI	6.5	3.2	49.2	37.5	65
	V	6.0	2.4	40.0	32.5	52
Subtraction.....	VIII	10.1	7.3	72.3	69.4	86
	VII	8.3	5.4	65.0	69.3	83
	VI	7.3	3.6	49.3	54.7	81
	V	5.7	2.0	35.1	50.9	63
Multiplication ...	VIII	7.2	5.8	80.5	65.3	82
	VII	7.2	4.5	62.5	55.7	78
	VI	6.2	3.2	51.6	52.1	77
	V	4.6	1.6	34.8	32.1	57
Division.....	VIII	8.2	6.4	78.0	63.4	92
	VII	5.4	3.3	61.1	54.2	87
	VI	4.4	2.0	45.4	42.1	84
	V	3.2	1.—	31.2	15.1	53

In Table IV a comparison is given of the percentage of the examples correctly worked in the rural schools of a county

in southeastern Ohio, Santa Clara County, and in 24 cities of Kansas.

As we study Table IV or Chart I, one of the most striking points is the low grade of accuracy. Is this state of affairs, as it should be? Should we expect a higher percentage of accuracy? Should the boys and girls of a city system of schools make a higher median in accuracy than the boys and girls of a rural district? Is the condition due to the methods employed, or is it due to the small number of pupils in the rural school? Is there as great a degree of exactness required of the rural pupil as of the city pupil, or does this have anything to do with the situation? Is it due to the system, or is there a greater difference in the ability of the city and the rural child? Can the cause be traced to the amount of time spent on this part of arithmetic, or what may be the cause or causes? These are a few of the many questions that face us as we are making our comparisons. Perhaps there are a number of schoolmen out on the field of action at this time who can give valuable information upon this subject.

It would be a mistake to assume that these tests measure every phase of the work in arithmetic. There are reasoning processes which are not touched in these investigations.

Equally mistaken is the view that an inquiry of this type has reached its goal when it has set up a comparison between various parts of the country. Comparison is helpful only when it stimulates some kind of activity in the direction of the correction of defects. Comparisons of other types than that here exemplified are possible. Thus one may trace the changes that take place in the work of a single school during a period of years. In this case the school is compared with itself. Again, mere comparison is not the end of the investigation. Comparison brings out the points at which instructional effort should be redoubled. Tests are sometimes overemphasized, and the results are dwelt on without discrimination. When properly used, measurements are instruments to guide instruction. They are tools to aid in discovering where the weak and the strong points are. Just as a good carpenter has not *one* tool, but a *kit* of them in order to do the best work, so much the more necessary is it that the teacher who is handling boys and

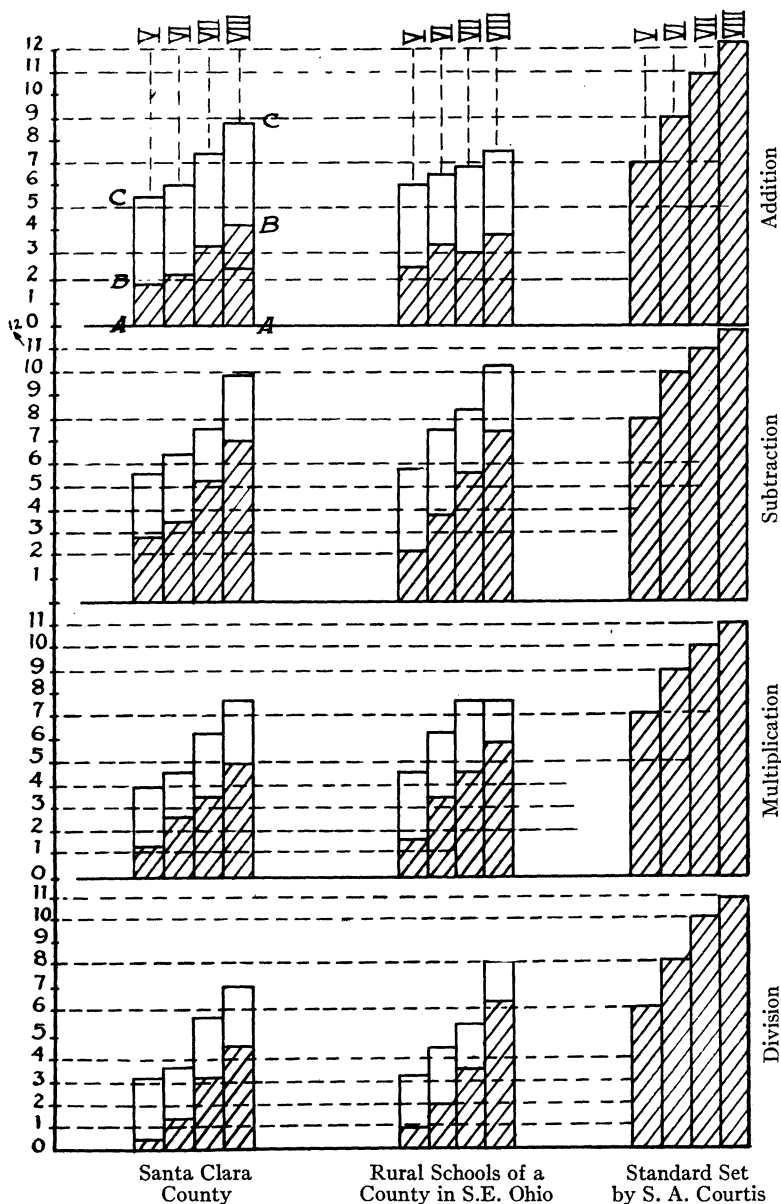


CHART I.—Shows the median of attempts and median of accuracy in the Grades V, VI, VII, and VIII, of Santa Clara County and a county in southeast Ohio, also the standard set by S. A. Courtis. Distance A-B=median of accuracy. Distance A-C=median of attempts.

girls have a kit full of the finest tools. Unless these tests are used for the purpose of aiding in diagnosing the cases they will fail to produce results. Or, to put the matter in another way, the purpose of the tests is to furnish a means through which the teacher and the superintendent will be able to discover a few more of the characteristics of the boy and the girl so that they may be able to reach the boy and the girl and give them beneficial care, which, otherwise, could not be provided.